

Detection of air and surface contamination by SARS-CoV-2 in hospital rooms of infected patients

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Abstract

Understanding the particle size distribution in the air and patterns of environmental contamination of SARS-CoV-2 is essential for infection prevention policies. Here we screen surface and air samples from hospital rooms of COVID-19 patients for SARS-CoV-2 RNA. Environmental sampling is conducted in three airborne infection isolation rooms (AIIRs) in the ICU and 27 AIIRs in the general ward. 245 surface samples are collected. 56.7% of rooms have at least one environmental surface contaminated. High touch surface contamination is shown in ten (66.7%) out of 15 patients in the first week of illness, and three (20%) beyond the first week of illness ($p = 0.01$, χ^2 test). Air sampling is performed in three of the 27 AIIRs in the general ward, and detects SARS-CoV-2 PCR-positive particles of sizes $>4 \mu\text{m}$ and $1\text{--}4 \mu\text{m}$ in two rooms, despite these rooms having 12 air changes per hour. This warrants further study of the airborne transmission potential of SARS-CoV-2. Here, the authors sample air and surfaces in hospital rooms of COVID-19 patients, detect SARS-CoV-2 RNA in air samples of two of three tested airborne infection isolation rooms, and find surface contamination in 66.7% of tested rooms during the first week of illness and 20% beyond the first week of illness.